CHAPTER I

INTRODUCTION

A sedentary lifestyle plays a significant role in obesity. Worldwide there has been a large shift towards less physically demanding work, and currently at least 60% of the world's population does not get sufficient exercise. This is primarily due to increasing use of mechanized transportation and a greater prevalence of labour saving technology in the home. World trends in active leisure time physical activity are controversial.

Through physical activities alone people were able to survive in this world. The story of evolution throws some light on the nature and types of activities which are an essential part of modern physical activities which are to be fit for day-to-day existence and to meet the occasional emergencies that arise. Whatever may the emergency that trust itself on individuals the human beings have to readjust and carry on.

An ideal man should be strong, healthy, broadminded and active **Majumdar (1950)** opines that “Activity is life while stagnation is death.”

Proper growth and maintenance of good health, participation in daily physical activities is an indispensable one. The high level of physical fitness comes from years of daily experience in a selected variety of vigorous physical

activities. It is a biological principle that function builds structure and structure decides function. Man needs vigorous exercises for growth and development. To perform the daily activities in a more efficient manner, a condition of muscles, their strength and endurance are essential.

Every human being participates in some kind of sports activity or physical exercise during the course of life. This exercise may assume different forms for different individuals. It may be walking, jogging, cycling, working in a factory, participation in games and sports etcetera. Regular participation in exercise programme markedly influences physical, physiological and mental fitness of an individual.

1.1 SPINNING CYCLE EXERCISES

Spinning cycle exercise started in California in the late 80s and early 90s, but it has really become a popular form of exercise over the last 10 years. Unlike a regular exercise bike workout, spinning cycle exercise involves a variety of movements and speeds, with spinners sometimes standing on the pedals and other times sitting like normal, some times pedaling at top speed and other times recovering at a slower pace. And unlike most modern exercise bikes, a spinner has a large flywheel front wheel, and has a real momentum and resistance. When done correctly, spinning cycle exercise burns a lot of calories - up to 450-500 for a 45 minutes workout. Most spinning cycle exercise average 45-60 minutes, with

movements synchronized to the music soundtrack that sets the pace. **(Korff et al (2007)**

1.1.2 BENEFITS OF SPINNING CYCLE EXERCISE

Cardiovascular exercise involves a repetitive movement of the large muscle groups of the body for a prolonged period of time. Cardiovascular machines come in different forms. Spinning cycle is one type of cardiovascular machine that simulates riding a cycle.

Weight Loss

Cardiovascular exercise is efficient at burning calories which can lead to weight loss. This can be done on the spinning cycle by riding for 45 to 60 minutes at a steady pace, or alternating between high and low intensities.

Muscle Endurance

Muscle endurance is characterized by doing consecutive muscle contractions for a long period of time. When using a stationary bike at a moderate intensity, one can increase the muscle endurance in lower body.

Strength

Working out on a stationary bike utilizes a lot of muscles. The glutes, quads, hamstrings, calves and even abs are all targeted. Working out on the bike

can help tone and strengthen these areas, especially when turning the resistance up high so the biker have to stand to pedal.

Posture

Having bad posture can lead to muscle imbalances and slouching. When working out on the stationary bike, one need to engage muscles in the hips, trunk and shoulders to stabilize the body. This will improve the posture and the balance at the same time. **(Millet, G. et al (2001)**

1.2 PROTEIN SUPPLEMENTATION

1.2.1 Protein and Metabolism

All foods that are eaten must be broken down and digested. Fats, carbohydrates and proteins are all broken down at different rates, because of the way they are composed. Fats break down very quickly regardless of their source while carbohydrates break down more slowly, with complex carbohydrates taken the longest period of time to break down among the two kinds. Protein on the other hand takes the longest to break down in the body and can leave the feeling full for a longer period of time.

1.2.2 Thermogenesis

During the digestive process, the body will create heat, this is said to be thermogenesis. Certain foods cause a higher rise in temperature than others; the higher the rate of thermogenesis, the faster food is burned without being stored in the body as fat. Fats are easily digested by the body and create very little thermogenesis. Proteins raise the rate of this phenomenon more than any other food group with only alcohol causing a higher rate of thermogenesis.

1.2.3 Testosterone

Testosterone is a steroid hormone from the androgen group and is found in mammals, reptiles, birds, and other vertebrates. In mammals, testosterone is primarily secreted in the testes of males and the ovaries of females, although small amounts are also secreted by the adrenal glands. It is the principal male sex hormone and an anabolic steroid.

In men, testosterone plays a key role in the development of male reproductive tissues such as the testis and prostate as well as promoting secondary sexual characteristics such as increased muscle, bone mass, and the growth of body hair. In addition, testosterone is essential for health and well-being as well as the prevention of osteoporosis.

On average, an adult human male body produces about ten times more testosterone than an adult human female body, but females are more sensitive to the hormone.

1.2.4 Obesity and testosterone level

Obesity and low testosterone are tightly linked. Obese men are more likely to have low testosterone. Men with very low testosterone are also more likely to become obese.

Fat cells metabolize testosterone to estrogen, lowering testosterone levels. Also, obesity reduces levels of Sex Hormone Binding Globulin (SHBG), a protein that carries testosterone in the blood. Less SHBG means less testosterone.

Losing weight through exercise can increase testosterone levels. Testosterone supplements in men with low testosterone can also reduce obesity slightly.

1.2.5 Metabolic Syndrome and Low Testosterone

Metabolic syndrome is the name for a condition that includes the presence of abnormal cholesterol levels, high blood pressure, waistline obesity, and high blood sugar. Metabolic syndrome increases the risk for heart attacks and strokes.

Studies show that men with low testosterone are more likely to develop metabolic syndrome. In short-term studies, testosterone replacement improved blood sugar levels and obesity in men with low testosterone. **(Davis A. (2007)**

1.3 OBESITY

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems. Body mass index (BMI), a measurement which compares weight and height, defines people as overweight (pre-obese) when their BMI is between 25 kg/m^2 and 30 kg/m^2, and obese when it is greater than 30 kg/m^2Obesity increases the likelihood of various diseases, particularly heart disease, type 2 diabetes, breathing difficulties during sleep, certain types of cancer, and osteoarthritis. Obesity is most commonly caused by a combination of excessive dietary calories, lack of physical activity, and genetic susceptibility, although a few cases are caused solely by genes, endocrine disorders, medications or psychiatric illness. (**Paffenbarger R et al.1986)**

1.4 NEED FOR BURNING OUT FAT

While exercising our muscles burn both fat and glucose in different proportions. Depending on how an individual exercises muscle can burn fat in a larger proportion to glucose.

When activity is light and easy people tend to burn a much higher percentage of fat. Fat is a slow burning fuel that requires oxygen so if oxygen is delivered to muscle cells in sufficient quantities the cells can easily burn fat for most of its energy requirement. A potential problem for weight loss is lighter exercise burns fewer total calories.

If an individual increases their effort by performing a more intense exercise to burn more calories however, because oxygen cannot always be delivered to the hard-working cells in sufficient quantities, cells are forced to burn more carbohydrates in order to keep up with increasing demand. If the level of exertion continues to increase then glucose eventually becomes the predominant energy source for muscles as this quick-burning fuel does not require oxygen.

It means to burn fat directly, the intensity of the exercise at a lower level of effort and for longer duration. However some people just don't have the time to exercise for longer periods. The only way to burn fat quickly is to increase the metabolism through anaerobic exercise so that the body can burn the fat indirectly. Fitness expert Tom Venuto has taught thousands of people worldwide exactly how to use certain exercises to burn fat fast. (**Bray GA. (2004**)

1.5 IMPACT OF SPINNING CYCLE ON OBESITY

Exercising cycles have always been very popular and successful among people to lose weight. While spinning cycles have had lots of success in losing weight and getting in great shape spinning bikes are the best way to move forward. Not only do they helps in losing the extra pounds they also greatly increase the cardiovascular endurance and tone the legs.

The purpose of every cardiovascular exercise is to increase heart rate which in result burns the extra fats around the body. This fat burning process not only tones the body muscles but also decreases the chances of any heart disease. All cardio exercises are directly dependent on the type of machine used. Spinning cycles are considered to be the best option due to their myriad benefits. **(Park HS, Park JY, Yu R (2005)**

1.6 IMPACT OF PROTEIN SUPPLEMENTATION ON OBESITY

The effect of exercise alone on weight loss is small, partly because muscle mass often increases even while fat tissue is reduced, and perhaps because some exercising people will experience increased appetites. The long-term effect of regular exercise on weight loss is much better, and exercise appears to help people maintain weight loss. People who have successfully maintained weight loss for over two years report continuing high levels of physical activity. Combining exercise with healthier eating habits results in the best short- and long-term effects

on weight loss, and should reduce the risk of many serious diseases. This also may help with people who experience “weight cycling”, who have a tendency toward binge eating. The most successful weight-loss programs appear to use a combination of moderate caloric restriction, moderate exercise, and behaviour modification, including examination and adjustment of eating habits. (**Layman DK, et.al. (2003)**

1.7 REASONS FOR SELECTION OF THE STUDY

There are many different forms of protein supplements and each offers a different benefit and some even offer a few cons. Researches show taking protein supplements help them build the muscle that they need. For many people they find that this practice is not a good idea while others think that it does not hurt anything. The truth of the matter is that there are pros and cons to this that means, if taken excessive amounts of protein, the extra calories will be stored as fat. It can also lead to over straining of kidneys and long term metabolic problems. Excess protein intake enhances diuresis (loss of body water) as the body excretes excess nitrogen (urea and ketones) through urine. This cause mineral losses and increases the risk of dehydration. There is further scope for research in this direction with the knowledge to stay safe. Spinning cycling is an effective mode of aerobic exercises which is more beneficial to sedentary men like software professionals. Spinning cycle exercises is having more benefits than regular

cycling exercises. In this research, the investigator was interested to find out which of the different experiments, that is, spinning cycle exercise, or protein supplementation, or combination of both is beneficial to software professionals in beneficially altering their lipid profiles and testosterone.

1.8 OBJECTIVE OF THE STUDY

The objective of this study was to find out the effect of spinning cycle exercise, protein supplementation and combination of both on lipid profile and testosterone level among obese men software professionals.

1.9 STATEMENT OF THE PROBLEM

The purpose of the study was to find out the effect of spinning cycle exercise and protein supplementation on lipid profile and testosterone level among obese men software professionals.

1.10 HYPOTHESIS

It was hypothesized that there would be a significant effect due to experimental treatments, namely, spinning cycle exercise, protein supplementation and combination of both on lipid profile and testosterone level among obese men software professionals compared to control group.

It was also hypothesized that the combined group would be better than other isolated treatments, namely, spinning cycle exercise and protein supplementation.

1.11 SIGNIFICANCE OF THE STUDY

1. By the year 2025, there will be more than 300 million obese sufferer's world wide. This epidemic will be followed by a wave of cardiovascular disease. This study is significant to find the way for reducing weight among software professionals.

2. In the clinical setting, every one percent increase in the baseline glycocylated hemoglobin level translates into a fifteen percent increase in risk of developing heart failure. This study which will help to stabilize and maintain obesity would continue for avoiding such heart failures.

3. One important cardiovascular risk factor is obesity. Even slight elevations of obese patients are associated with a substantial increase in cardiovascular risk and this study is also concerned with obesity in determining the effects of diet and exercise on obese software professionals.

4. This study is significant to the obese software professionals to suggest ways and means for reducing their obesity.

1.12 DELIMITATION

This research was delimited to the following areas:

1. In this research, experimental treatments, spinning cycle exercise; protein supplementation and combination of both were tested.

2. Only 60 male obese software professionals were taken as subjects for this study, divided into four groups, consisting of 15 in each.

3. The subjects of this study would be a group of obese men software professionals randomly selected from various places in Chennai. The age group ranged between 27 and 40 years.

4. The following variables were selected for this study:

Dependent Variables

Lipid Profiles

1. Triglycerides
2. Low Density Lipoprotein
3. Very Low Density Lipoprotein
4. High Density Lipoprotein

5. Total Cholesterol
6. Testosterone

Independent Variable

1. Spinning cycling exercise for 12 weeks
2. Protein supplementation for 12 weeks
3. Combination of both Spinning cycling and protein supplementation for 12 weeks
4. Control group

1.13 LIMITATIONS

The following limitations were considered while interpreting the results of the study.

1. The environmental factors, such as temperature of the exercise, area duration and intensity of the exercise could not be controlled.
2. Though the subjects were motivated verbally, no attempt was made to differentiate the motivation level during the period of testing.
3. Due to resource constraints, subject and laboratory availability, the number of tests and the length of the testing periods, sample sizes were restricted in the present study.

4. No effort was made to control the nature of life style, nutritional status and the daily dietary intake, climatic condition, physiological factors and other factors that affect metabolic function.

5. The subjects were from different social, cultural and economic backgrounds.

1.14 DEFINITION AND EXPLANATION OF THE TERMS

1.14.1 TRIGLYCERIDES

Tryglycerides are commonly occurring fats that are more accurately classified as simple lipids and predominant form of fats found in the human diet. Triglycerides consist of a glycerol backbone with three fatty acids attached. Triglycerides serve as a major energy reserve and are stored primarily in adiposities located throughout the body. Triglycerides are also stored in lesser amounts in the liver and muscle where they are more readily available for use as energy during exercise **(Heather Hedrich Fink, Burgoon and Mikesky, 2006).**

1.14.2 LOW DENSITY LIPOPROTEIN (LDL)

Low-density lipoprotein (LDL) is the main cholesterol transporter and carries cholesterol from liver to the cells that need it. If there is too much cholesterol for the cells to use, this can cause a harmful build-up in blood. Too much Low Density Lipoprotein cholesterol in the blood can cause cholesterol to

build-up in the artery walls, leading to disease of the arteries. For this reason, Low Density Lipoprotein cholesterol is known as 'bad cholesterol'. **(Heather Hedrich Fink, Burgoon and Mikesky, 2006)**

1.14.3 VERY LOW-DENSITY LIPOPROTEIN (VLDL)

Very-low-density is a type of lipoprotein made by the liver. Very-low-density lipoprotein is one of the five major groups of lipoproteins (chylomicrons, vldl, low-density lipoprotein, intermediate-density lipoprotein, high-density lipoprotein 1) that enable fats and cholesterol to move within the water-based solution of the blood stream. Very-low-density lipoprotein is assembled in the liver from triglycerides, cholesterol, and apolipoproteins, vely-low-density lipoprotein is converted in the blood stream to low-density lipoprotein (LDL). Very-low-density lipoprotein transport endogenous products. **(Heather Hedrich Fink, Burgoon and Mikesky, 2006)**

1.14.4 HIGH DENSITY LIPOPROTEIN (HDL)

High-density lipoprotein (HDL) is commonly referred to as the "good cholesterol." High-density lipoprotein has higher protein content and a smaller triglyceride and cholesterol content than low-density lipoproteins (LDL). HDL levels in the body are supposed to be fairly high. HDL helps excess cholesterol from the blood stream and arteries and delivering to the liver for excretion through the gastrointestinal system. High-density lipoprotein (HDL) is often

considered protective against cardiovascular disease **(Heather Hedrich Fink, Burgoon and Mikesky, 2006).**

1.14.5 TOTAL CHOLESTEROL

Cholesterol is the fatty substance formed in the blood. Cholesterol is a white fatty alcohol of steroid group, found in body tissue, blood and bile, assists in synthesis of vitamin D and various hormones. Excessive deposits of cholesterol inside arteries are associated with arteriosclerons and coronary heart disease. TC was estimated using erymatic calorismetric method and expressed as mg/dl. **(Heather Hedrich Fink, Burgoon and Mikesky, 2006).**

1.14.6 TESTOSTERONE

Testosterone is defined as a potent steroid hormone secreted mainly by the testes. It can be extracted from the testes of animals or synthesized and used to treat androgen deficiency or promote anabolism. **(Heather Hedrich Fink, Burgoon and Mikesky, 2006).**